

DOCUMENT RESUME

ED 157 819

SO 011 029

TITLE Energy in the Global Marketplace. Grades 9, 10, 11. Interdisciplinary Student/Teacher Materials in Energy, the Environment, and the Economy.

INSTITUTION National Science Teachers Association, Washington, D.C.

SPONS AGENCY Office of the Assistant Secretary for Intergovernmental and Institutional Relations (DOE), Washington, D.C. Education, Business and Labor Affairs.

REPORT NO HCP/U3841-0007

PUB DATE Mar 78

CONTRACT NOTE EX-76C-10-3841
54p.; For related documents, see SO 011 027-030 ; Best copy available

AVAILABLE FROM U.S. Department of Energy, Technical Information Office, P.O. Box 62, Oak Ridge, Tennessee 37830 (free, paper cover)

EDRS PRICE MF-\$0.83 Plus Postage. HC Not Available from EDRS.

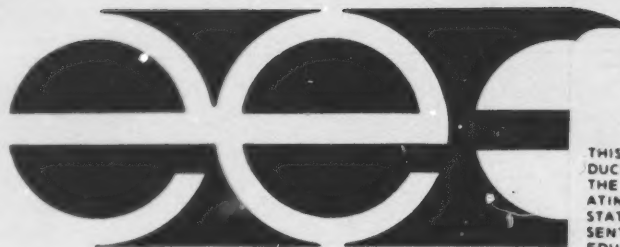
DESCRIPTORS Class Activities; *Economic Education; Economics; *Energy; *Global Approach; Grade 9; Grade 10; Grade 11; Lesson Plans; Secondary Education; Social Studies Units; Teacher Developed Materials; World Geography

ABSTRACT

This instructional unit contains six classroom lessons in which 9th, 10th, or 11th grade social studies students examine the effects of competition among nations and world regions as demand for oil outstrips supply. The overall objective is to help students understand the concept that energy is a commodity to be bought and sold like any other commodity but in a marketplace that is a global one. The lessons were written by teachers and can be integrated into social studies, economics, world history, contemporary issues, and world geography courses. The lessons are: (1) Why Some Nations Use More Energy; (2) Energy: Who Has It; Who Needs It?; (3) From Those Who Have To Those Who Want: The Oil Trade Routes; (4) What If...Everyone Wants More?; (5) Retrodollars: The Problem of Too Much Money; and (6) The Oil Price Game -- Everybody Plays (A Simulation Of The World Market for Oil). The activities in which students are involved include analyzing maps, graphs, and charts; answering questions based on short reading selections; and playing games. Each lesson can be taught in one classroom period. All teachers and student materials are included. (Author/RM)

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Interdisciplinary Student/Teacher Materials in Energy, the Environment, and the Economy

Energy in the Global Marketplace

Grades 9, 10, 11

March 1978

**National Science
Teachers Association**

Prepared for
U.S. Department of Energy
Office of Education, Business and Labor Affairs
Under Contract No. EX-76C-10-3841

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This instructional unit was produced by NSTA's Project for an Energy-Enriched Curriculum under Contract #EX-76C-10-3841 from the Education Programs Branch, Office of Public Affairs, the U.S. Energy Research and Development Administration (now U.S. Department of Energy). The NSTA project staff is as follows:

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"Energy in the Global Marketplace" is the product of a writing session held at the University of Maryland during Summer, 1977. The following teachers were the main contributors to this unit:

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The PEEC staff also wishes to acknowledge the cooperation of the National Council for the Social Studies (NCSS) and its Executive Director, Brian Larkin. The NCSS has suggested teachers and consultants to us and has assisted in evaluation and review of the social studies aspect of this unit.

March 1978
John M. Fowler
Project Director

ENERGY IN THE GLOBAL MARKETPLACEIntroduction

The year 1976 was the Bicentennial of the United States. As it opened, the country's attention turned toward the prospect of facing bitterly cold temperatures with much of the family budget going toward buying heating fuels. The shock of the 1973 oil embargo came back to most Americans as the deep freeze made everyone aware of their nearly total dependence on oil and natural gas. Fuel deliveries, delayed by ice-locked rivers and bays and rerouted ship deliveries, made Americans, who were about to enter the third century of their existence, gloomily aware that foreign oil was increasingly being used to satisfy their needs.

Six years ago the bill for imported oil was \$317 million. Now it is \$45 billion. In 1985 it could be twice that much. It is, perhaps, the bleakest domestic scenario presented to the American people since the Great Depression, but some would argue that for much of the world, the situation is even bleaker. Their problems cannot begin to be attacked by voting for painful, but necessary items such as higher gasoline taxes or mandatory conservation measures.

Oil trading illustrates increasing interdependence, and we have used it as the focus of this unit. With it as the main subject, students can examine the concept that energy is a commodity to be bought and sold like any other commodity, but in a marketplace that is a global one. In such a marketplace, the producers and the consumers become interdependent, with trade considerations that are political as well as economic.

In this unit students examine the effects of supply and demand on prices and study the effects of competition among nations and world regions as demand outstrips supply. In so doing they discover some of the factors that help to create large demand. They

also look at the ripple effects of the flow of enormous amounts of oil dollars. By participating in a simulation, students are exposed to some of the components that determine prices under free and controlled market conditions.

Lessons in this unit with brief descriptions of the subject matter follow:

<u>Lesson</u>	<u>Contents</u>	<u>Target Audience</u>
1	<u>Why Some Nations Use More Energy</u>	Social studies, economics
2	<u>Energy: Who Has It; Who Needs It?</u>	Social studies, economics
3	<u>From Those Who Have To Those Who Want: The Oil Trade Routes</u>	Social studies, economics
4	<u>What If....Everyone Wants More?</u>	Social studies, economics
5	<u>Petrodollars: The Problem of Too Much Money</u>	Social studies, economics
6	<u>The Oil Price Game--Everybody Plays (A Simulation of the World Market for Oil)</u>	World history, economics, Contemporary Issues, world geography

Teachers Manual

Lesson 1: WHY SOME NATIONS USE MORE ENERGY

Overview Energy consumption can vary per person worldwide by as much as a 450:1 ratio. The United States, for example, consumes per person over 450 times as much energy as the country of Mali. In this lesson students compare the energy consumption patterns in several nations by Gross National Product (GNP), which is the total amount of goods and services produced by a nation, and study the probable relationship between energy use and wealth.

Target Audience Social studies, economics.

Objectives Students should be able to:

1. Explain GNP per capita and energy use per capita.
2. Identify the range of energy consumption patterns.
3. Discuss the relationship between GNP and energy use.

Time Allotment One class period. Three, if the research activity is included.

Materials Student worksheet, "Energy: Who Uses It?"

Teaching Strategies Introduce the students to the difference between GNP or the total amount of goods and services produced in a country and the per capita income.

Draw two circles on the board. Label one circle nation A, the other nation B. Assume that both nations have the same GNP. For convenience, make this \$100,000.

Divide both circles into eight parts. The parts represent population. Assume both countries have the same population. Ask the class: if the income in each country is distributed equally, will the people have the same income? (Yes.)

Divide one circle into many more parts. Ask the class what this represents. (*Growing population.*) If the GNP stays the same, what will happen to the per capita income of each nation when one nation has a growing population and the other has a stable population? (*The per capita income of the growing population declines.*) Ask the students how a nation can maintain the same per capita income with a growing population. (*The GNP must increase.*)

What factors lead to an increase in GNP? (*Industrialization, growing work force, exports.*)

Developing
the Lesson

Distribute student worksheet, "Energy: Who Uses It?"

Have students answer the questions. In discussing Question 3, make sure the students understand that work, transportation and recreational patterns (in addition to the efficiency at which energy is used) contribute to the level of energy use.

Extending
the Lesson

Have students choose one nation to study the relation of energy to different cultural patterns such as housing, transportation or work. More advanced students could compare one nation to the United States.

Student Worksheet: ENERGY: WHO USES IT?

Look carefully at the chart on this page. Separate the nations according to their GNP--high, medium, or low. Write the letters H, M, or L in the appropriate column. (Medium means the dollar amounts come between the low and high.)

Do the same in the Annual Energy Units Column. Then answer the questions.

ENERGY CONSUMPTION PER UNIT OF GNP

Country	H,M,L	1974 GNP/Person* (in U.S. Dollars)	H,M,L	Annual Energy Units Per Person**
Afghanistan	L	81.	L	23.
Argentina	M	1246.	M	1490.
Brazil	L	750.	L	435.
Canada	H	5372.	H	7870.
Egypt	L	259.	L	241.
Ethiopia	L	83.	L	34.
France	H	4851.	M	3314.
Haiti	L	143.	L	24.
India	L	117.	L	157.
Iran	L	762.	L	865.
Japan	M	3812.	M	2755.
Laos	L	100.	L	71.
Mali	L	73.	L	21.
Pakistan	L	126.	L	68.
Saudi Arabia	M	1299.	L	813.
Sweden	H	6155.	H	5140.
Switzerland	H	6346.	M	3015.
United States	H	6155.	H	9500.
USSR		Not Available	H	3825.

*The total value of the goods and services produced in a country divided by the total population.

**Units refer to energy consumption in barrels of crude oil equivalent per person.

1. Are high GNP nations also high energy users? Why or why not? (Yes, nations with high GNP are usually industrialized and need energy. Individuals can often afford high energy using items like cars. However, among the high GNP nations, some use much less energy than others.)

2. What does industry have to do with high GNP?
(Industrialized nations generally produce more goods and services and can afford to pay higher wages.)
3. The United States, Sweden and Switzerland have similar GNP per capita but different energy use per capita. What factors might explain these differences? (Work, transportation, recreational patterns and the level of efficiency at which energy is used.)

Lesson 2: ENERGY: WHO HAS IT; WHO NEEDS IT?

Overview	Few nations today reach a balance between their energy needs and their energy supplies. Some are vastly out of proportion. In this lesson students use a world map to help them identify the energy balance in several world nations. They also develop a beginning understanding of the terms energy independence and energy interdependence.
Target Audience	Social studies, economics.
Objectives	Students should be able to: 1. Locate energy producing and energy consuming nations on a world map. 2. Identify some of the factors that influence energy supply and demand. 3. Develop working definitions of the terms energy independence and energy interdependence.
Time Allotment	One class period.
Materials	Copies of Student Worksheet: "Energy Supply and Energy Demand"
Teaching Strategies	To introduce the idea that the supply and demand for energy is the result of a combination of resources, technology, lifestyle, costs, and prices, tell the students to suppose that you have the only known supply of widgets or some other non-existent item. How much will you have to pay for this scarce item? What makes it cost so much? What makes it valuable? Assuming some of the students do want to buy a widget, what do they need? Would every student have the same ability to demand a widget--and get it? Why not? <i>(Those with more money could buy more widgets; those</i>

with a greater demand for widgets might be willing to spend more.)

What similarities are there between the "market" for widgets and the market for oil? (A limited supply controlled by a limited number of suppliers.)

What are the major differences? (The demand for oil is real and is often the result of essential needs. Because demand is so limited, widgets are not scarce.)

Developing the Lesson

Why are the similarities in the market for oil today somewhat like the market for widgets? Why has it become increasingly valuable? List the reasons on the board, as the students mention them. (Growing demand for oil from industrialized nations, limited supply in some nations, the cost of getting and transporting oil, high costs of opening new wells, etc.)

Distribute copies of the world map, "Energy Supply and Energy Demand" and the accompanying chart. Have students read the legend carefully, then answer the questions.

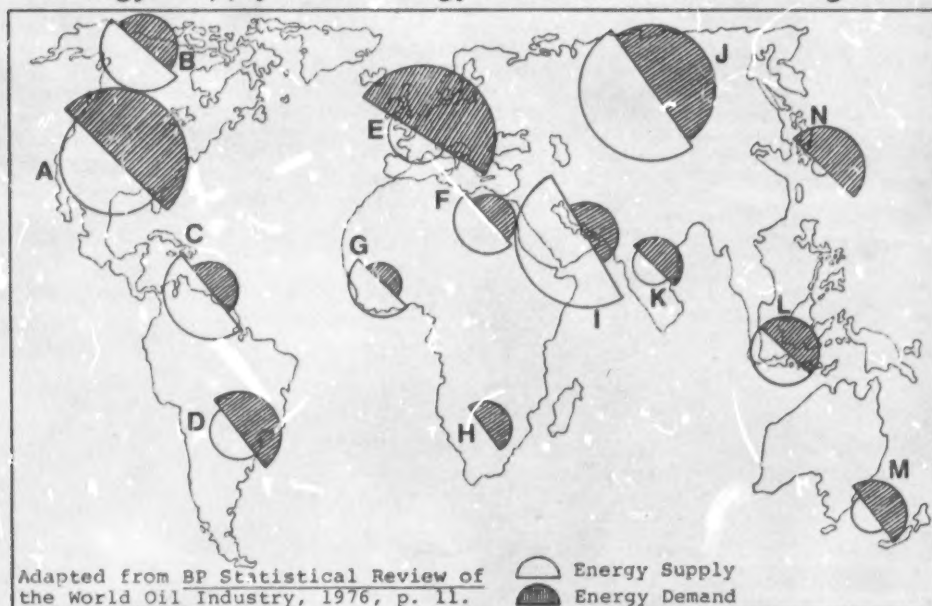
Concluding the Lesson

Conclude the lesson with a class discussion of the effects of global energy patterns. Why might Japan's need for oil influence its relations with other countries? What if developing nations demand more and more oil? How might these demands affect oil prices? Oil supplies? Political alliances?

Extending the Lesson

Have interested students choose another energy source as the topic for a report: coal, natural gas, uranium, etc. Whatever the topic, have them describe it, explain its uses, tell why the demand for it has grown, and some recent developments in methods of transporting it. Show the energy source on a distribution map similar to the one used in this lesson.

Energy Supply and Energy Demand in World Regions



Put a check in the appropriate column. Base your choice on the information on the map. The first one has been done for you.

Code	Area or Nation	Supply Greater than Demand	Demand Greater than Supply	Balance Supply & Demand
A.	United States		x	
B.	Canada	x		
C.	Caribbean	x		
D.	South America		x	
E.	Western Europe		x	
F.	North Africa	x		
G.	West Africa	x		
H.	South Africa		x	
I.	Middle East	x		
J.	USSR	x		
K.	South Asia		x	
L.	Southeast Asia		x	x
M.	Australia		x	
N.	Japan		x	

Student Worksheet: ENERGY SUPPLY AND ENERGY DEMAND
Questions

You will need to look carefully at both the map and the chart in order to answer the following:

1. Which regions probably have to buy oil from foreign countries?
 - A. *United States*
 - B. *South America*
 - C. *Western Europe*
 - D. *South Africa*
 - E. *South Asia*
 - F. *Australia*
 - G. *Japan*
2. Which regions (or nations) have more oil than they need for their own use at the present time?
 - A. *Middle East*
 - B. *Canada*
 - C. *Caribbean*
 - D. *West Africa*
3. Trade partners are those who have something to sell and those who need to buy. Can you find several possible trade partners? List them. Partners can be mentioned more than once.
 - A. *Middle East* ----- *West Europe*
 - B. *Canada* ----- *United States*
 - C. *Caribbean* ----- *South America*
 - D. *Caribbean* ----- *United States*

Others

4. In addition to the need for oil and the supply of oil, what other factors will influence what nations will be trade partners?
(*Economic considerations such as the ability to pay for the oil and political considerations such as alliances.*)

Lesson 3: FROM THOSE WHO HAVE TO THOSE WHO WANT:
THE OIL TRADE ROUTES

Overview Energy accounts for over ten per cent of the value of all international trade. Ninety per cent of the energy trade is in oil. The routes that develop reflect the distribution patterns of supply and demand. In this lesson students hypothesize possible trade routes and compare these to real ones. Then they use this data to help explain the interdependence of world trade.

Target Audience Social studies, economics.

Objectives Students should be able to:

1. Predict trade routes from energy supply and demand data.
2. Identify some factors leading to trade in energy.
3. Determine the effects of trade on both the importer and the exporter.

Time Allotment One class period (without research assignment).

Materials Student worksheet, "From Those Who Have to Those Who Want"

Teaching Strategies Distribute copies of student worksheet, "From Those Who Have to Those Who Want". Have students compare their guesses with their actual routes.

Developing the Lesson Have students answer questions 1-4 on the worksheet. In the discussion, point out some of the political and economic causes and consequences of the trade in oil. For example; Under what circumstances might Japan begin to buy oil from the USSR? (Possible answers are: 1) If the USSR sets prices lower than the Middle East; or if (2) the Middle East refuses to sell oil to Japan; or (3) the political climate between Japan and the USSR changes.)

What might be some other factors?

What might happen to Japan under another embargo?

Ask similar questions about other nations.

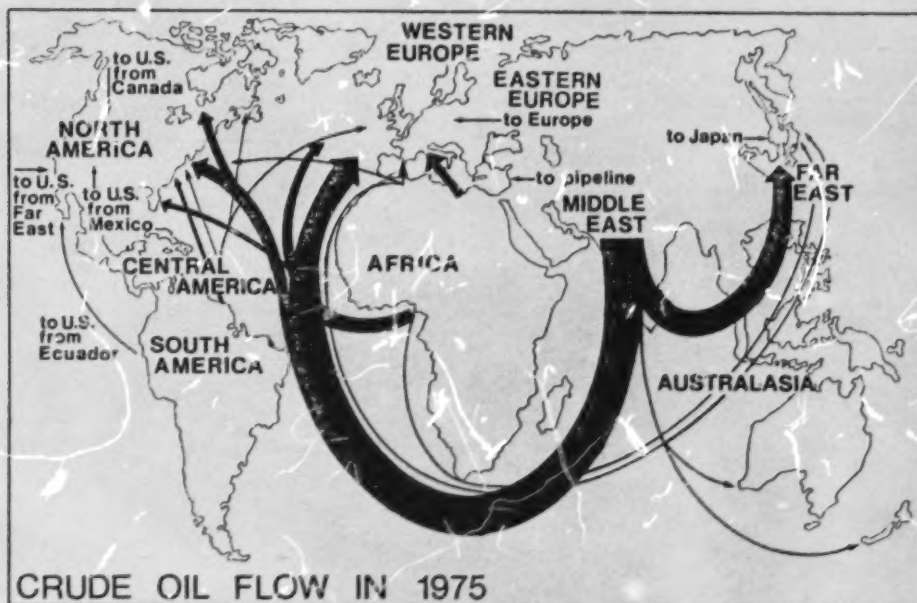
Extending
the Lesson

Have a small group research the effects of the 1973 oil embargo. Use the following questions to give some direction to the research:

Guide Questions

1. What nations imposed the embargo? Which nations were embargoed?
2. How long did the embargo last? Which nations were cut off from oil sources longer than others? Why?
3. How did oil-short nations deal with the embargo? Did they make any trade adjustments? Did changes occur in the lives of the people? Explain.
4. What short-term and long-term policy changes emerged in embargoed nations as a result of the scare?

Student Worksheet: FROM THOSE WHO HAVE TO THOSE
WHO WANT



Adapted from Bureau of Mines,
Division of Petroleum and Natural
Gas.

The map above shows the movement of crude oil in 1975. Look carefully at the routes, then answer each question.

1. From what countries does the United States get most of its imported oil?
(Middle East, West Africa and the Caribbean.)
2. What nations or areas appear to be most dependent on Middle Eastern Oil?
(Western Europe, Japan, and North America.)
3. What effects might an oil embargo from the Middle East have on these nations?
(Answers may vary, but unless substitute sources of energy were quickly found, which is unlikely, serious economic dislocations would follow, such as high unemployment, increased prices, poverty, etc.)

4. Some nations in Africa and Asia don't have oil, yet they don't buy any either, why not? (Either very little energy is needed or they can't afford it.)

Lesson 4: WHAT IF....EVERYONE WANTS MORE?

Overview	In the past few years the cost of oil and the volume of oil traded has risen dramatically. This lesson explores some of the multiple effects of these increases on oil importing nations. On the basis of present trends, students predict possible future consequences.
Target Audience	Social studies, economics.
Objectives	Students should be able to: 1. Explain the effects of increasing prices of imported oil on developed and developing nations. 2. Generalize about the long range effects of present trends in energy (particularly oil) consumptions. 3. Read and interpret graphs and tables.
Time Allotment	One class period.
Materials	Duplicated class sets of tables and graphs for this lesson
Teaching Strategies	One good way to generate interest in this lesson is to write several prices for gasoline on the board. For example, \$1, \$2, \$4, \$10. Ask: At what price would you begin to make changes in your driving habits? What kind of changes? Would you be more likely to change your driving habits if you were wealthy or if you were poor? How would changes in driving affect other parts of your life? Move the discussion to the national level. Would a country with a high GNP (review the term, if necessary) have the same response to an increase in the price of gas as a country with a low GNP? Why or why not?

Next, distribute copies of the worksheets for this lesson. Help students read and interpret the graph and the table. Then have them answer each question as an informal evaluation of their skill at predicting trends.

Help students interpret the graph by asking the following skill review questions:

1. What is the title of the graph? Why is it important to read the title of any graph first?
(*"World Energy Consumption". The title tells you what you can learn from a particular source of information.*)
2. Look at the legend. What special marking represents the United States? Where do you look for the lines or dots that represent the other countries?
(*In the legend.*)
3. Identify the marking that represents each of the following: Western Europe, Communist Countries, Japan, Rest of the World.
4. What do the numbers on the vertical axis mean?
(*Millions of barrels per day.*)
5. What is the time span shown on the horizontal axis?
(*Thirty years.*)

Distribute the reading and treat it in the manner of a guided reading lesson. The questions can serve as an evaluation tool.

About the Graph: World Energy Consumption

1. What was the daily world energy consumption in 1970?
(100 million barrels.)
2. What is the predicted daily consumption by 2000?
(410 million barrels.)
3. In 1970 what percent of the total world's daily consumption did the United States use?
(32%.)
4. What trend is predicted for the United States in its use of the world energy supplies? A smaller or larger percentage?
(Smaller.)
5. Suppose there is a limited amount of oil in the ground. What conflicts can you see developing in international relations?
(Increasing competition for the scarce resource. Some of the poorer nations may not be able to afford the increased price.)

About the Table: Daily Average of U.S. Crude Oil Imported by Country

1. What percentage of the oil used daily was imported in 1973? What percentage did we import in 1977?
(35.8%; 1977 - 47.6%.)
2. From where did we get most of our imported oil in 1973? Now where do we get most of it?
(In 1973 most of the imported oil was from non-Arab nations. In 1977, almost 50% was from the Arab world.)
3. Since 1973, presidents of the United States have urged Americans to become less dependent on foreign oil. According to the table, have they been successful?
(No, the percentage of imports compared to total energy consumption has increased.)

4. We still have oil in our own country. What factors help explain why we import oil?
(We don't produce enough oil in this country and don't expect ever again to be able to; the price of imported oil is less than the cost of developing some of our resources.)
5. Why, do you think, are some people concerned about the trend in oil imports from the Middle East?
(Dependence on imports from one area, particularly one which has not always had friendly relations with the U.S., leaves us vulnerable.)

THE ENERGY CRISIS AND DEVELOPING NATIONS

In many ways the energy crisis has hit developing nations harder than it has affected industrial giants such as the United States and Western Europe. For one thing, traditional energy sources used by most developing nations--firewood, charcoal, grasslands for animals--are growing scarce. As they get harder to find, they become more expensive.

Trees, of course, are a renewable resource, but they can only grow so fast. To meet the demands of ever-growing populations, younger and younger trees are being cut down. This means that some of the energy yields are less. And when people are cold and hungry, there is no civilized way to protect young trees. It is becoming necessary to use them for heat and cooking fires rather than save them for use after they mature.

Cutting down trees has other consequences. Without trees for cover, the topsoil begins to wash away. New trees cannot easily take root and rain will not soak into the subsoil quickly enough to renew the watertable. Instead, most of the rainwater runs off into gullies. Consequently, wells must be drilled deeper and the water pumped farther to reach the surface. These wells use a lot of energy, and so increase the shortage of energy supply.

Firewood is not the only source of energy in short supply in the third world. Oil use had been expanding rapidly in these nations until the 1973-74 embargo. Then, many developing countries discovered that their dependence on imported oil had made them vulnerable. By one estimate, a shortage of fuel for irrigation pumps in 1974 reduced the wheat harvest in India by a million tons.

The rising price of oil has had a severe effect on the developing nations. To be sure, the cost of oil has risen by the same amount everywhere. For many of the developing nations, however, this increase represents a large portion of their GNP. Moreover, at the same time that developing countries have had to adjust to paying higher prices for oil, they have had to pay higher prices for the manufactured goods that they import. These prices went up because the industrial countries that produce these goods pass on their increased oil costs to the buyers. Developing nations' exports, on the other hand, have failed to rise fast enough to balance out the price of imported manufactured goods. This imbalance between imports and exports is growing more unfavorable.

Some of the third world countries are hopeful that they will find oil within their country. Some authorities believe that these areas may contain half of the world's remaining undiscovered oil. If oil is found, the developing nations will have to make some serious choices. For many, it might be better to sell the oil at the present price of about \$13.00 per barrel rather than use it themselves. They could then use the money to develop renewable sources of energy such as solar power.

In the meantime, the people of the developing nations will have an increasingly difficult time dealing with rising energy costs.

Adapted from Energy for Development
Third World Options, World Watch
Paper, December 1977.

Try These!

1. What have been traditional sources of energy in developing nations?
(Wood and muscle power have played a relatively large role.)
2. Why are these traditional sources unable to meet the needs of the people?
(Population has grown at a faster rate than energy supply.)
3. How does erosion create a need for more energy?
(Wells must be drilled deeper and water pumped further, more energy needed for food production, dams fill up with silt.)

4. What is the relation between energy shortage and reduction in farm products?
(Among other things, energy - particularly oil - is needed for irrigation, fertilizer and farm machinery.)
5. List two ways developing nations were hurt by the high oil prices.
(They had to pay more for oil and also more for imported manufactured products that cost more to make.)

Lesson 5: PETRODOLLARS: THE PROBLEM
OF TOO MUCH MONEY

Overview	The OPEC (Organization of Petroleum Exporting Countries) nations, especially those in the Middle East, have benefitted greatly from the trade in oil. Increased demand for oil combined with increased prices have given these nations enormous amounts of money. The focus of this lesson is on the domestic and international uses of money by oil-rich states.
Target Audience	Social studies, economics.
Objectives	Students should be able to: 1. Explain why OPEC nations are dependent on the sale of oil. 2. Define the term "Petrodollar". 3. List possible effects of an accumulation of petrodollars in the OPEC nations on international relations and world economic stability.
Time Allotment	One class period.
Materials	Copies of student reading: "Petrodollars: The Problem of Too Much Money"
Teaching Strategies	Begin this lesson by recalling the game of Monopoly. Ask: What happens when one player controls all the railroads, Park Place hotels and has hotels on the Boardwalk, too? Why do other players run out of money when they land on your "property"? How can you go bankrupt in the game? Point out that if the object of the game were to keep the game going, rich players would eventually have to get some money back in the hands of the other players. How is the game of Monopoly like the world trade in oil? Have students read the selection, and then answer the questions.
Extending the Lesson	Have a small group of interested students devise a game similar to Monopoly, and played with the same rules. Change the board to include oil wells; change cards to include vast winnings in petrodollars, etc.

Lesson 5

Student Worksheet: PETRODOLLARS: THE PROBLEM OF TOO MUCH MONEY

Imagine having a product to sell that has a value of: the entire U.S. farm crop; all the steel produced in the United States for four and a half years; 10,000 fighter aircrafts; 3,200,000 private homes; or all cars and trucks produced for three and a half years!

The members of the Organization of Petroleum Exporting Countries (OPEC) are in this unique position. Together they control half of the world's crude oil. OPEC nations collect over 125 billion dollars per year from the sale of oil.

Costs of producing oil in the Middle East are low. The oil lies near the land surface, and supertankers provide an energy-efficient and fairly inexpensive means of transporting the oil to world markets. As a result, much of the money from oil sales is profit. This profit can amount to more than 60 billion dollars a year in some countries.

This enormous wealth is new to most OPEC nations. Up to recent years anyway, they have had little manufacturing and few natural resources besides oil. The standard of living has generally been among the lowest in the world.

OPEC nations have relied almost totally on imports for their manufactured items and much of their food. The profits from the sale of oil have been used to pay for these goods. In addition, profits from the sale of oil are used to pay for programs in housing, health care, and industrial development.

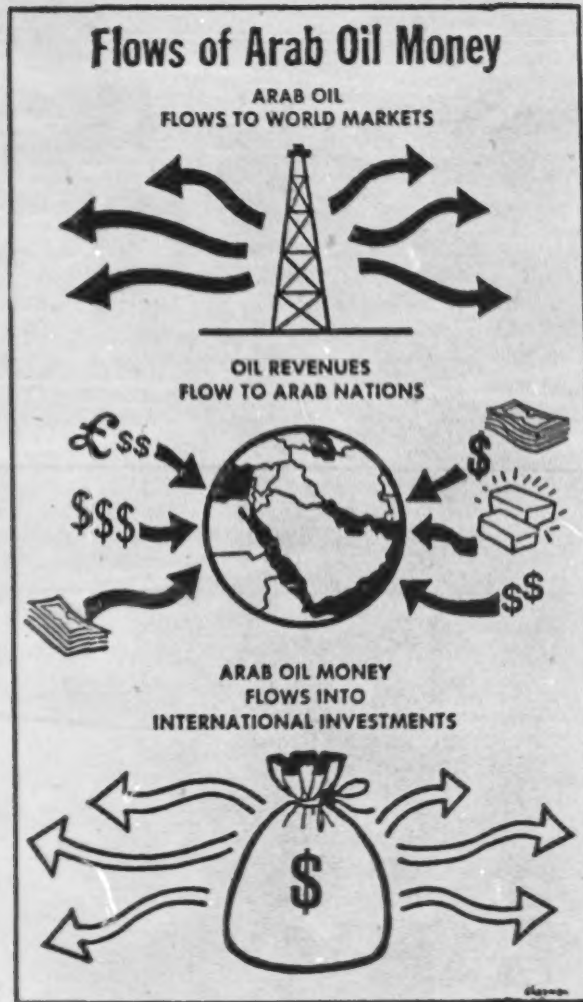
For many Middle Eastern OPEC nations, much of the profit from oil goes toward defense. As long as war seems possible, Middle Eastern nations spend a great deal of their oil profits on military weapons. And as long as these nations spend so much on defense, they have less to spend on improving living conditions for their people.

Yet this still leaves enormous amounts of money that OPEC nations cannot use at home. They in-

vest this money in other nations around the world. When money comes from oil producing nations to other nations, it is generally called "Petrodollars".

Petrodollars have been used to buy into a number of world businesses. Among the companies partially owned by Arab and other OPEC nations are: Daimler-Benz, manufacturers of Mercedes Benz automobiles; Arizona Land and Cattle Company of Phoenix; Kiawah Island, South Carolina; Krupp Steel Works of West Germany; Security National Bank of San Jose, California.

The diagram shows how the flow of money from oil consuming nations to oil producing nations works.



Reprinted with permission from Continuing Energy Crisis in America, Congressional Quarterly, 1975, P. 38.

Try These Questions

1. What are Petrodollars?
(The income that the OPEC nations get from the sale of oil.)
2. Why do OPEC nations have billions of Petrodollars? (By forming a cartel the OPEC nations were able to increase the price of oil while also increasing the quantity of oil sold.)
3. Why are OPEC nations dependent on the sale of oil? (These nations have few other natural resources. Without the income from the sale of oil they could not pay for the items that they need.)

4. How have the OPEC nations used the Petrodollars within their countries? (Roads, schools and resource development programs. Some of the money has gone for military expenses.)
5. Why are some economists worried about Petrodollars? (If the OPEC nations can buy control of some of the large corporations, they may gain economic and political power within the U.S.)

Lesson 6: THE OIL PRICE GAME--EVERYBODY PLAYS
(A Simulation of the World Market for Oil)

Overview	This activity presents trade dilemmas for members in a competitive market and in a controlled market. Using the example of the world market for oil, students examine the effects of competition and non-competitive cartel prices.
Target Audience	World history, economics, Contemporary Issues, world geography.
Objectives	Students should be able to: 1. Describe the effects that different market conditions have on prices. 2. Identify the forces which work to strengthen or to weaken world market agreements. 3. Determine the effects of high oil prices on one aspect of modern life in the research activity.
Time Allotment	One class period. Four, if the research activity is included in class time.
Materials	32 SELL cards 32 BUY cards
Optional	Class set of Student Research Activity Questions
Teaching Strategies	Divide the class into two groups. Distribute one set of cards to the Oil Consuming nations; a different set of cards to the Oil Producing nations. Tie white arm bands on the Oil Producers and use another color tie for the Oil Consumers when you are ready to play. Allow plenty of time for students to get a notion of the game and learn the procedure. Anticipate some difficulty with learning how transactions are made and prices reported.

Play begins with the distribution of Buy and Sell Cards. (It will help speed up the game if you match the color of the card to the arm band color.) the 32 BUY cards should be worded:

BUY

BUY 1,000 BARRELS OF OIL FOR NOT MORE THAN \$ _____ PER BARREL. TRY TO GET THE BEST PRICE YOU CAN BELOW THIS PRICE. DO NOT BUY OIL ABOVE THIS PRICE. IF YOU HAVEN'T BOUGHT ANY OIL AFTER 5 MINUTES, GET ANOTHER BUY ORDER.

Insert price per barrel on each BUY card according to this distribution.

Price	Number of Cards
\$21.00	4
19.00	4
17.00	4
15.00	4
13.00	4
11.00	4
9.00	2
7.00	2
5.00	2
3.00	2

SELL

SELL 1,000 BARRELS OF OIL FOR NOT LESS THAN \$ _____ PER BARREL. TRY TO GET THE BEST PRICE YOU CAN ABOVE THIS PRICE. DO NOT SELL OIL BELOW THIS PRICE. IF YOU HAVEN'T SOLD ANY OIL AFTER 5 MINUTES, GET ANOTHER SELL ORDER.

Insert price per barrel on each SELL card according to this distribution.

Price	Number of Cards
\$19.00	2
17.00	2
15.00	2
13.00	2
11.00	4
9.00	4
7.00	6
5.00	6
3.00	4

A complete set of Buyer and Seller cards should be used whenever the game is played with a class of more than 32 students. While the game is played, the cards should be kept in separate stacks on a desk near where the recorder is tallying the prices. As cards are turned in, students should take a different buy or sell order, according to their roles. Individual cards may be used more than once in the game, but make sure students don't keep cards for more than one transaction. If a student is unable to complete a transaction within five minutes, a new card may be given out to replace the old instructions.

Record the price on the board where students can see the price at which oil is being sold. One way to show the tendency of prices to reach some "equilibrium" level is to record prices by time period. The following table could be used to record this information on the board.

Price	Five Minutes of Play	Second Five Minutes of Play	Third Five Minutes of Play
\$21			
20			
19			
18			
17			
16			
15			
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			

Prices at left list the possible prices at which oil could be sold in the game. As students report each transaction, make a mark beside the price reported.

Separate transactions made during the first five minutes from those in other time frames. Transactions tend to move toward the equilibrium as time passes, mainly because more buyers and sellers become aware of the prices of oil.

After fifteen minutes, or sooner if the price has stabilized, declare the market closed, collect all outstanding cards, and ask the students to analyze what happened. Deal with the following questions:

1. Economists often talk about the supply and demand for a certain product. Who demanded oil in the game?
(The Buyers; the Oil Consuming nations.)
2. Who were the suppliers?
(The Sellers; the Oil Producing nations.)
3. At the beginning of the game, what was the range, the highest and the lowest price at which oil sold? Was the price range as wide during the succeeding five-minute periods? Why or why not?
(Most simulations start off with the maximum range, from \$3 to \$21, with transaction moving toward the theoretical equilibrium of \$11, by the end of the game. Don't expect \$11 as the only price at the game's end. Prices will nearly always vary, but with each round the variance will lessen.)
4. By the end of the game, what price do you think would have been acceptable to the majority of Buyers and Sellers? Why?
(Answers will vary. Usually students will see that a price becomes acceptable when it is not violating the majority of Buyers and Sellers instructions, and when it still allows some profit to both parties.)
5. What happened when a seller tried to sell at a price higher than the acceptable price? Did the same thing happen when a buyer tried to buy at a price lower than the acceptable one?
(Students should suggest that the price above or below this acceptable price would be impossible for most participants to meet.)

6. How does the market for oil differ from the real world market?
(Some students should be aware of the existence of OPEC, the Organization of Petroleum Exporting Countries, but if they are not, you should present them with the following:

OPEC was founded in 1960 primarily to force the oil companies to keep oil prices up. In these years, prices for Arab oil were running below \$2.00 a barrel. Since then, the cartel has worked to coordinate actions by the oil producing nations, mostly to ensure high prices.

While it moved slowly in the early 1960's, probably because of the world surplus of oil, by the 1970's OPEC became almost a household word with its embargo on shipments of oil to the United States and other industrialized countries during the 1973 Arab-Israeli War. Since then OPEC nations have used their monopolistic position to raise the price of oil from somewhere around \$2 in 1970 to over \$13 per barrel in 1977.

OPEC has twelve members. Arab nations such as Saudi Arabia (the world's largest producer), Kuwait, and Libya; with other members from Africa--Nigeria and Algeria; South America--Ecuador and Venezuela; and the non-Arab Iran.)

7. How do you think the game could be changed to make it more like the real world market for oil?

(Students should be encouraged to suggest ideas. Somewhere in the discussion an oil cartel simulation will be mentioned. If there is sufficient interest, go on with the next phase of this simulation. An outline for a simulation of an OPEC type of cartel follows.)

Special Note

The student worksheet for this part of the simulation develops in greater depth concepts of equilibrium prices, and supply and demand.

THE OIL PRICE GAME

Part II

The first part of the simulation created a world market for oil, but it was unlike the present real market because it contained competition among both buyers and sellers. Today the world market for oil is dominated by a single selling cartel--OPEC.

To simulate a cartel, tell Sellers that they must agree upon a price before beginning any bargaining. They must not change this price during the bargaining session.

Allow enough time for the oil producers to determine the oil price. After the "cartel" has decided on a price, distribute BUY cards to the rest of the class. These students should be instructed to buy oil at the lowest price possible, and yet not violate their instructions. Record the transactions as before. You should anticipate two outcomes:

1. Students in the "cartel" will stay with their fixed price thus making it impossible for some buyers to purchase oil. Frustration will bring the game to an end quickly, with only a few students being able to make a transaction.
2. Sometimes "cartel" members will be unable to maintain their fixed prices, because of pressure imposed by the frustrated buyers. If this happens, keep the game going until the fixed price is either reestablished, or dissolves entirely.

During the deliberations of the oil producers, the rest of the class members should talk about how a cartel such as OPEC got started. Some points to be mentioned are:

1. The existence of a product that is needed and which has few, if any, substitutes.
2. The existence of a desire to make more money.
3. The necessity of having only a few producers, thus minimizing disagreement. OPEC has only twelve members.

At the end of the simulation have students review what occurred. Use the following questions to help guide the thinking. Note, however, that some questions deal with specific outcomes. If these have not occurred, then do not use these questions. These have been marked with an asterisk.

- A. How did the outcome of this game differ from the first one?

(Probable answers: difference in final price; cartel produces a higher price.)

- B. Why were the members of the cartel able (or unable) to maintain their price?

(Refer students to the factors which allow a cartel to exist, page 38.)

If the game produced a divided cartel, then students should suggest some of the reasons would be: the desire to earn more money by underselling the cartel members; pressure from buyers, which in real conditions can take military and political forms; or the inability of all sellers to make maximum profits, even at cartel price, and for many reasons.

- *C. If the cartel was broken, what could have been used to maintain the fixed price of oil? *(Greater discipline among members; a political motive for maintaining the price; deciding on a different price, either higher or lower; trying harder to keep all members satisfied.)*

- *D. Of the two types of world oil markets, which is better for consuming nations? *(The competitive market.)* Which is probably the best one for producing nations? *(The cartel.)*

- E. What are some possible effects of ever-rising oil prices? *(Governments will have strong incentives to search for more oil or to develop alternative sources of energy.)* Is this happening in the United States today? *(Yes, to some extent.)* What might happen if the price of oil climbed to unbelievable heights? *(Gloomy predictions of world-wide economic depressions. These, of course, could reduce the demand for oil to a point where oil producing nations would receive less money than usual.)*

Concluding
the Lesson

Conclude the lesson by reviewing some of the complex forces that bear on the pricing of commodities in world marketplaces. Encourage further research into the effect of higher prices of oil on people and the way they live. Assign students to do the following research activity.

For Further
Research

Research one aspect of high energy prices. Choose one of the following: (a) residential and commercial buildings; (b) agriculture; (c) transportation; (d) leisure time activities; (e) industrial production; (f) new fuels and search for new sources of energy (or a return to old fuels). Use the following questions as a guide to your research.

1. Throughout most of our history, what energy policy have Americans followed with regard to -----(name your specific area)? Has that policy contributed to any present problems in this area? List them.
2. What other problems does the nation face in this area today?
3. Are there current programs or projects intended to deal with these problems? Is the government sponsoring or encouraging any of these programs, such as conserving energy in these areas? Have they been effective so far? Why or why not? What are some private business programs? Are they effective?
4. Which solutions do you favor? Why?
5. What sacrifices will be needed to overcome high energy use (and resultant customer cost) in the area you are investigating? Do you think people will be willing to make these sacrifices? How can they be convinced?

Student Guide

Lesson 1

Student Worksheet: ENERGY: WHO USES IT?

Look carefully at the chart on this page. Separate the nations according to their GNP--high, medium, or low. Write the letters H, M, or L in the appropriate column. (Medium means the dollar amounts come between the low and high.)

Do the same in the annual Energy Units Column. Then answer the questions.

ENERGY CONSUMPTION PER UNIT OF GNP

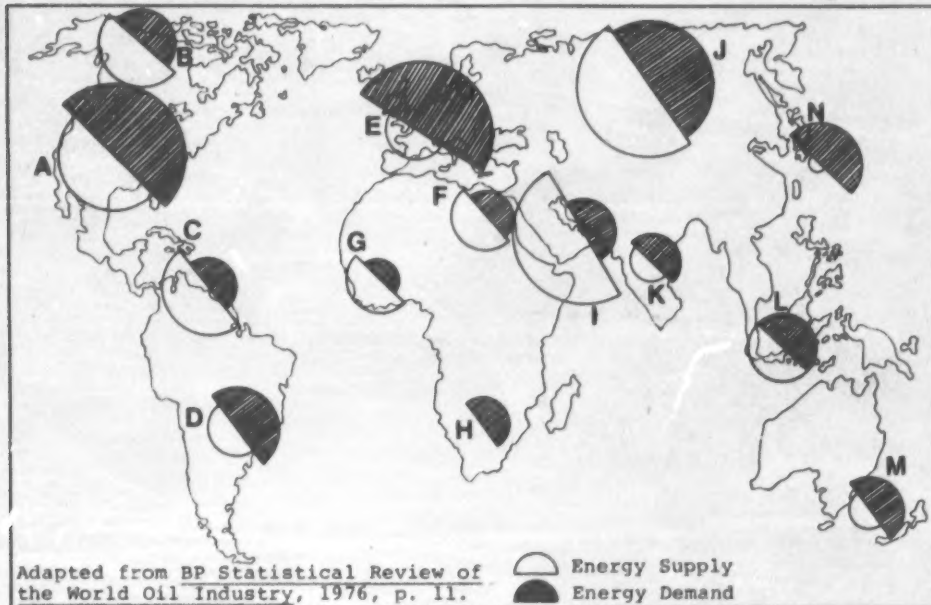
Country	H,M,L	1974 GNP/Person* (in U.S. Dollars)	H,M,L	Annual Energy Units Per Person**
Afghanistan		81.		23.
Argentina		1246.		1490.
Brazil		750.		435.
Canada		5372.		7870.
Egypt		259.		241.
Ethiopia		83.		34.
France		4851.		3314.
Haiti		143.		24.
India		117.		157.
Iran		762.		865.
Japan		3812.		2755.
Laos		100.		71.
Mali		7.		21.
Pakistan		126.		68.
Saudi Arabia		1299.		813.
Sweden		615.		5140.
Switzerland		6346.		3015.
United States		6155.		9500.
USSR		Not Available		3825.

*The total value of the goods and services produced in a country divided by the total population.

**Units refer to energy consumption in barrels of crude oil equivalent per person.

1. Are high GNP nations also high energy users? Why or why not?
2. What does industry have to do with high GNP?
3. The United States, Sweden and Switzerland have similar GNP per capita but different energy use per capita. What factors might explain these differences?

Energy Supply and Energy Demand in World Regions



Put a check in the appropriate column. Base your choice on the information on the map. The first one has been done for you.

Code	Area or Nation	Supply Greater than Demand	Demand Greater than Supply	Balance Supply & Demand
A.	United States		x	
B.	Canada			
C.	Caribbean			
D.	South America			
E.	Western Europe			
F.	North Africa			
G.	West Africa			
H.	South Africa			
I.	Middle East			
J.	USSR			
K.	South Asia			
L.	Southeast Asia			
M.	Australia			
N.	Japan			

Student Worksheet: ENERGY SUPPLY AND ENERGY DEMAND
Questions

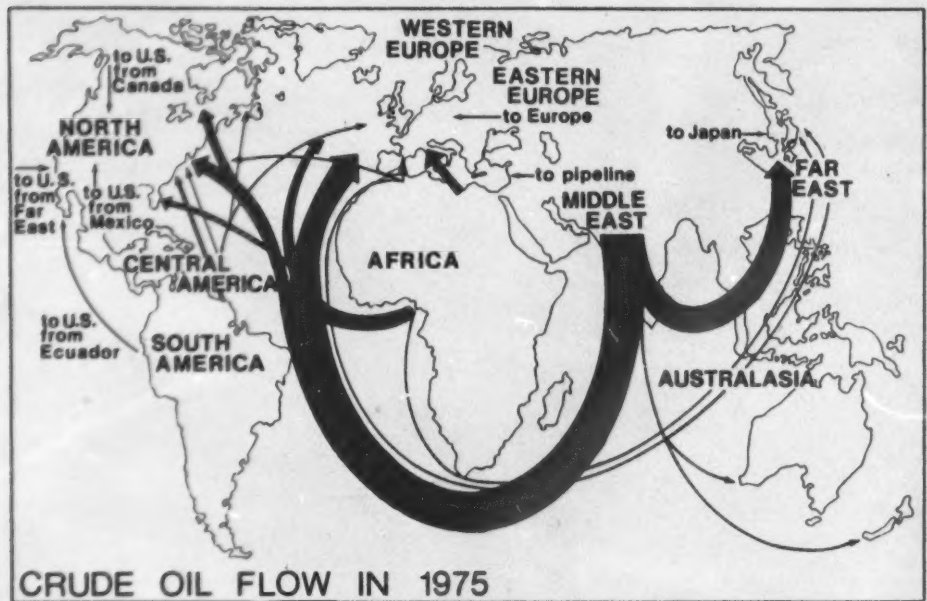
You will need to look carefully at both the map and the chart in order to answer the following:

1. Which regions probably have to buy oil from foreign countries?
 - A.
 - B.
 - C.
 - D.
 - E.
 - F.
 - G.
2. Which regions (or nations) have more oil than they need for their own use at the present time?
 - A.
 - B.
 - C.
 - D.
3. Trade partners are those who have something to sell and those who need to buy. Can you find several possible trade partners? List them. Partners can be mentioned more than once.
 - A.
 - B.
 - C.
 - D.

Others
4. In addition to the need for oil and the supply of oil, what other factors will influence what nations will be trade partners?

Lesson 3

Student Worksheet: FROM THOSE WHO HAVE TO THOSE WHO WANT



Adapted from Bureau of Mines,
Division of Petroleum and Natural
Gas.

The map above shows the movement of crude oil in 1975. Look carefully at the routes, then answer each question.

1. From what countries does the United States get most of its imported oil?
2. What nations or areas appear to be most dependent on Middle Eastern Oil?
3. What effects might an oil embargo from the Middle East have on these nations?
4. Some nations in Africa and Asia don't have oil, yet they don't buy any either, why not?

World Energy Consumption

Graph 1

Millions of Barrels Daily *

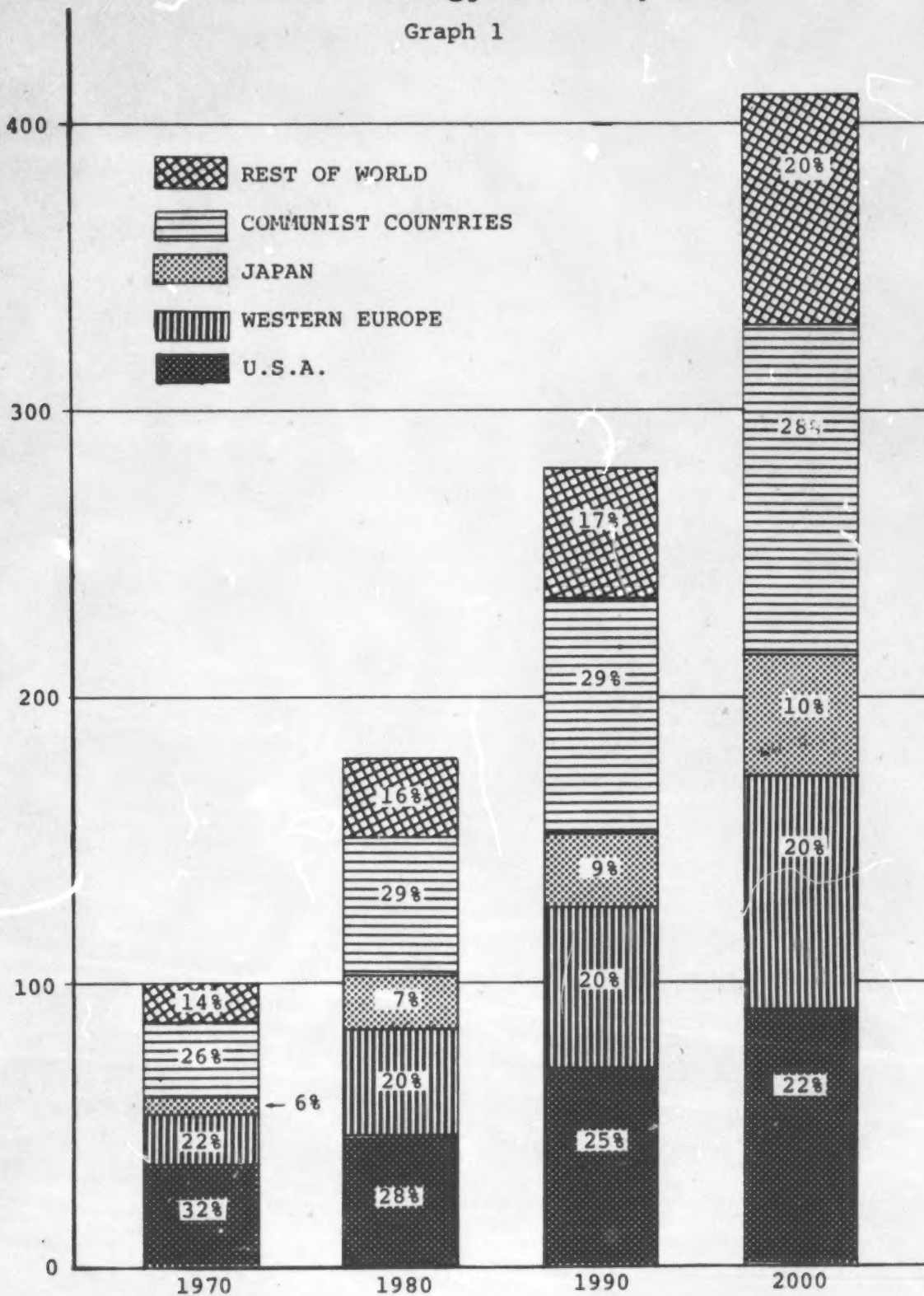


Table I

Read the table on this page. As you read keep in mind the question: How important is Middle Eastern oil to the United States? Then answer the questions on the next page.

<u>Daily Average of U.S. Crude Oil</u> <u>Imported by Country</u>			
<u>Source</u>	<u>1973</u>	<u>1975</u>	<u>1977 (Jan.-July)</u>
Total Imports as % of Daily Needs	35.8%	37.0%	47.6%
Arab Oil	25.6%	29.4%	47.4%
Saudi Arabia	9.5	14.1	21.2
Kuwait	2.6	.5	1.0
Libya	5.6	5.5	9.8
Iraq	.8	.2	.8
United Arab Emirates	2.6	2.8	5.0
Algeria	2.3	4.8	9.6
Others	2.3	1.5	.6
Non-Arab Oil	74.4%	70.6%	52.6%
Iran	6.8	8.3	7.7
Venezuela	29.7	17.2	3.4
Indonesia	4.0	7.5	7.2
Canada	17.7	13.3	4.6
Nigeria	8.9	13.6	18.6
Others	7.3	10.8	11.1
Domestic Supply	64.2%	63.0%	52.4%

International Economic Report of the President, Table 4,
pages 65 and 71, 1973.

International Economic Report of the President, Table 74,
page 182, 1975.

Oil and Gas Journal, Volume 75, No. 30, page 141, 1977.

Student Worksheet: WHAT IF...EVERYONE WANTS MORE?

About the Graph: World Energy Consumption

1. What was the daily world energy consumption in 1970?
2. What is the predicted daily consumption by 2000?
3. In 1970 what percent of the total world's daily consumption did the United States use?
4. What trend is predicted for the United States in its use of the world energy supplies? A smaller or larger percentage?
5. Suppose there is a limited amount of oil in the ground. What conflicts can you see developing in international relations over this supposition? Base your answer on the trends you see in the graph.

About the Table: Daily Average of U.S. Crude Oil Imported by Country

1. What percentage of the oil used daily was imported in 1973? What percentage did we import in 1977?
2. From where did we get most of our imported oil in 1973? Now where do we get most of it?
3. Since 1973 Presidents of the United States have urged Americans to become less dependent on foreign oil. According to the table, have they been successful?
4. We still have oil in our own country. What factors help explain why we import oil?
5. Why, do you think, are some people concerned about the trend in oil imports from the Middle East?

THE ENERGY CRISIS AND DEVELOPING NATIONS

In many ways the energy crisis has hit developing nations harder than it has affected industrial giants such as the United States and Western Europe. For one thing, traditional energy sources used by most developing nations--firewood, charcoal, grasslands for animals--are growing scarce. As they get harder to find, they become more expensive.

Trees, of course, are a renewable resource, but they can only grow so fast. To meet the demands of ever-growing populations, younger and younger trees are being cut down. This means that some of the energy yields are less. And when people are cold and hungry, there is no civilized way to protect young trees. It is becoming necessary to use them for heat and cooking fires rather than save them for use after they mature.

Cutting down trees has other consequences. Without trees for cover, the topsoil begins to wash away. New trees cannot easily take root and rain will not soak into the subsoil quickly enough to renew the watertable. Instead, most of the rainwater runs off into gullies. Consequently, wells must be drilled deeper and the water pumped farther to reach the surface. These wells use a lot of energy, and so increase the shortage of energy supply.

Firewood is not the only source of energy in short supply in the third world. Oil use had been expanding rapidly in these nations until the 1973-74 embargo. Then, many developing countries discovered that their dependence on imported oil had made them vulnerable. By one estimate, a shortage of fuel for irrigation pumps in 1974 reduced the wheat harvest in India by a million tons.

The rising price of oil has had a severe effect on the developing nations. To be sure, the cost of oil has risen by the same amount everywhere. For many of the developing nations, however, this increase represents a large portion of their GNP. Moreover, at the same time that developing countries have had to adjust to paying higher prices for oil, they have had to pay higher prices for the manufactured goods that they import. These prices went up because the industrial countries that produce these goods pass on their increased oil costs to the buyers. Developing nations' exports, on the other hand, have failed to rise fast enough to balance out the price of imported manufactured goods. This imbalance between imports and exports is growing more unfavorable.

Some of the third world countries are hopeful that they will find oil within their country. Some authorities believe that these areas may contain half of the world's remaining undiscovered oil. If oil is found, the developing nations will have to make some serious choices. For many, it might be better to sell the oil at the present price of about \$13.00 per barrel rather than use it themselves. They could then use the money to develop renewable sources of energy such as solar power.

In the meantime, the people of the developing nations will have an increasingly difficult time dealing with rising energy costs.

Adapted from Energy for Development
Third World Options, World Watch
Paper, December 1977.

Try These!

1. What have been traditional sources of energy in developing nations?
2. Why are these traditional sources unable to meet the needs of the people?
3. How does erosion create a need for more energy?
4. What is the relation between energy shortage and reduction in farm products?
5. List two ways developing nations got hit by the high oil prices.

Lesson 5

Student Worksheet: PETRODOLLARS: THE PROBLEM OF TOO MUCH MONEY

Imagine having a product to sell that has a value of: the entire U.S. farm crop; all the steel produced in the United States for four and a half years; 10,000 fighter aircrafts; 3,200,000 private homes; or all cars and trucks produced for three and a half years!

The members of the Organization of Petroleum Exporting Countries (OPEC) are in this unique position. Together they control half of the world's crude oil. OPEC nations collect over 125 billion dollars per year from the sale of oil.

Costs of producing oil in the Middle East are low. The oil lies near the land surface, and supertankers provide an energy-efficient and fairly inexpensive means of transporting the oil to world markets. As a result, much of the money from oil sales is profit. This profit can amount to more than 60 billion dollars a year in some countries.

This enormous wealth is new to most OPEC nations. Up to recent years anyway, they have had little manufacturing and few natural resources besides oil. The standard of living has generally been among the lowest in the world.

OPEC nations have relied almost totally on imports for their manufactured items and much of their food. The profits from the sale of oil have been used to pay for these goods. In addition, profits from the sale of oil are used to pay for programs in housing, health care, and industrial development.

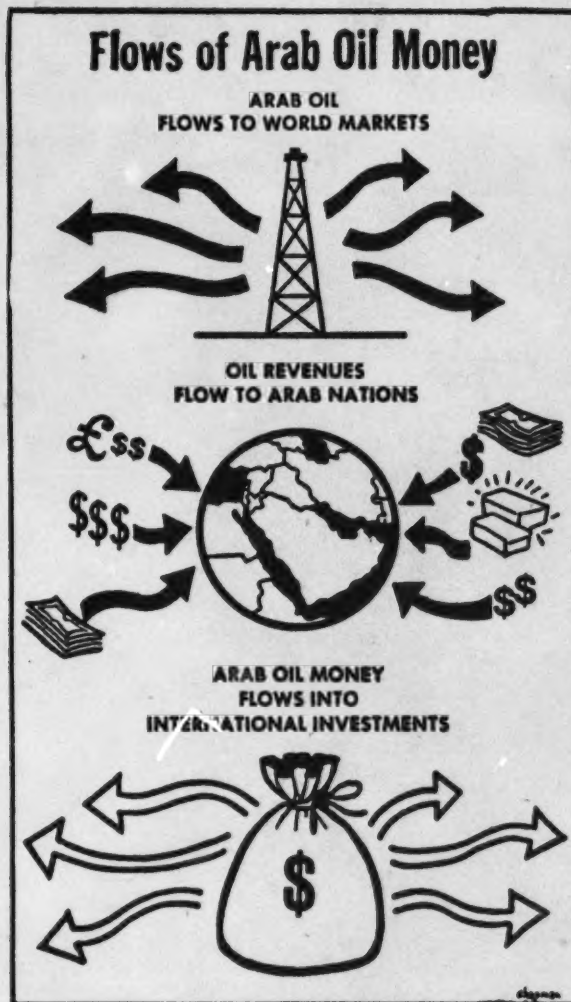
For many Middle Eastern OPEC nations, much of the profit from oil goes toward defense. As long as war seems possible, Middle Eastern nations spend a great deal of their oil profits on military weapons. And as long as these nations spend so much on defense, they have less to spend on improving living conditions for their people.

Yet this still leaves enormous amounts of money that OPEC nations cannot use at home. They in-

vest this money in other nations around the world. When money comes from oil producing nations to other nations, it is generally called "Petrodollars".

Petrodollars have been used to buy into a number of world businesses. Among the companies partially owned by Arab and other OPEC nations are: Daimler-Benz, manufacturers of Mercedes Benz automobiles; Arizona Land and Cattle Company of Phoenix; Kiawah Island, South Carolina; Krupp Steel Works of West Germany; Security National Bank of San Jose, California.

The diagram shows how the flow of money from oil consuming nations to oil producing nations works.



Reprinted with permission from Continuing Energy Crisis in America, Congressional Quarterly, 1975, p. 38.

Try These Questions

1. What are Petrodollars?
2. Why do OPEC nations have billions of Petrodollars?
3. Why are OPEC nations dependent on the sale of oil?
4. How have the OPEC nations used the Petrodollars within their countries?
5. Why are some economists worried about Petrodollars?

BUY

BUY 1,000 BARRELS OF OIL FOR NOT MORE THAN
\$ _____ PER BARREL.

TRY TO GET THE BEST PRICE YOU CAN BELOW THIS
PRICE. DO NOT BUY OIL ABOVE THIS PRICE. IF
YOU HAVEN'T BOUGHT ANY OIL AFTER 5 MINUTES,
GET ANOTHER BUY ORDER.

SELL

SELL 1,000 BARRELS OF OIL FOR NOT LESS THAN
\$ _____ PER BARREL.

TRY TO GET THE BEST PRICE YOU CAN ABOVE THIS
PRICE. DO NOT SELL ANY OIL BELOW THIS PRICE.
IF YOU HAVEN'T SOLD ANY OIL AFTER 5 MINUTES,
GET ANOTHER SELL ORDER.

Research Activity

Research one aspect of high energy prices. Choose one of the following areas: (a) residential and commercial buildings; (b) agriculture; (c) transportation; (d) leisure time activities; (e) industrial production; (f) new fuels and search for new sources of energy (or a return to old fuels). Use the following questions as a guide to your research.

1. Throughout most of our history, what energy policy have Americans followed with regard to the area you are researching? Has that policy contributed to any present problems in this area? List them.
2. What other problems does the nation face in this area today?
3. Are there current programs or projects intended to deal with these problems? Is the government sponsoring or encouraging any of these programs, such as conserving energy in these areas? Have they been effective so far? Why or why not? What are some private business programs? Are they effective?
4. Which solutions do you favor? Why?
5. What sacrifices will be needed to overcome high energy use (and resultant customer cost) in the area you are investigating? Do you think people will be willing to make these sacrifices? How can they be convinced?